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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

FEELY, MICHAEL J

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/590,442	Applicant(s) HONMA ET AL.	
	Examiner Michael J. Feely	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 17-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20060824</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Pending Claims

Claims 1-49 are pending.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

2. Applicant's election without traverse of Group I (claims 1-16) in the reply filed on April 20, 2009 is acknowledged.
3. Claims 17-49 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 20, 2009.

Claim Interpretation

4. In claims 1-12 the recitation "*for carbon-fiber-reinforced composite materials,*" has been given little patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See

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In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In the instant case, the preamble merely recites the intended use of the composition, wherein the prior art can meet this future limitation by merely being capable of such intended use.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3-5, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Honda et al. (US Pat. No. 5,994,429).

Regarding claims 1, 3-5, 7, and 8, Honda et al. disclose: **(I)** an epoxy resin composition (Abstract) for carbon-fiber-reinforced composite materials (*capable of intended use*: column 3, line 65 through column 4, line 21), comprising the following components [A], [B] and [C]:

[A] epoxy resin (Abstract; column 2, lines 22-35),

[B] amine curing agent (Abstract; column 2, lines 36-44), and

[C] phosphorus compound (Abstract; column 2, line 45 through column 3, line 23),

wherein the concentration of the component [C] is 0.2 to 15% by weight in terms of phosphorus atom concentration (column 3, lines 31-40);

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(3) characterized by comprising red phosphorus as the component [C] (Abstract; column 2, line 45 through column 3, line 23); (4) characterized in that the red phosphorus is coated with a metal hydroxide and/or a resin (Abstract; column 2, line 45 through column 3, line 23);

(5) characterized in that the amine curing agent, as the component [B], is dicyandiamide (Abstract; column 2, lines 36-44; Example 3);

(7) characterized in that the amine curing agent, as the component [B], is an aromatic polyamine (Abstract; column 2, lines 36-44); and

(8) further comprising a curing accelerator as a component [D] (column 3, lines 55-64).

Claim Rejections - 35 USC § 102/103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 11, and 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Honda et al. (US Pat. No. 5,994,429).

Regarding claims 2, 11, and 12, the teachings of Honda et al. are as set forth above and incorporated herein. They fail to explicitly disclose: (2) characterized in that the viscosity of the composition is 10 to 700 Pa's at 60°C; (11) characterized in that the specific gravity of the composition is 1.35 or lower; (12) characterized in that the composition can be cured within 30 minutes at 150°C.

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It appears that the composition of Honda et al. would have inherently satisfied these properties because it satisfies all of the material/chemical limitations of the instant invention. This is particularly the case where little to no inorganic filler is present (*see column 3, lines 31-40*). In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that the composition of Honda et al. would have inherently satisfied the instantly claimed properties because it satisfies all of the material/chemical limitations of the instant invention.

Claim Rejections - 35 USC § 103

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Goto et al. (US 2003/0135011).

Regarding claim 6, Honda et al. disclose the use of an amine-type curing agent, such as dicyandiamide and aromatic amines (*see column 2, lines 36-44*). However, they fail to explicitly disclose: **(6)** characterized in that the amine curing agent, as the component [B], is a latent curing agent that is activated at 70 to 125°C.

Goto et al. disclose a similar epoxy-based composition used for pre-prepregs (*see Abstract; paragraphs 0011-0026*). They use a latent curing agent with curing power at 100°C or below (*see paragraphs 0015 & 0047-0049*) in concert with an aromatic amine-based curing

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agent (*see paragraphs 0016 & 0050-0051*), wherein the latent curing agent includes amine adduct-type curing agents (*see paragraph 0048*). The use of both these curing agents: (a) provides a storage stable composition at room temperature; (b) yields die-releasable cured products by primary curing at low temperature; and (c) yields highly heat-resistant cured products by secondary curing (*see Abstract; paragraph 0011*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a latent curing agent that is activated at 70 to 125°C, as taught by Goto et al., in the composition of Honda et al. because Goto et al. disclose that the use of (amine) latent curing agents in concert with aromatic amine-based curing agents: (a) provides a storage stable composition at room temperature; (b) yields die-releasable cured products by primary curing at low temperature; and (c) yields highly heat-resistant cured products by secondary curing.

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Qureshi et al. (US Pat. No 5,087,657).

Regarding claims 9 and 10, Honda et al. contemplate the use of any curing accelerator, as long as it is generally used in accelerating curing of an epoxy resin (*see column 3, lines 55-64*). However, they fail to disclose: **(9)** characterized in that the curing accelerator, as the component [D], is a compound that has 2 or more urea bonds per molecule; and **(10)** characterized in that the curing accelerator, as the component [D], is 1,1'-4(methyl-m-phenylene)bis(3,3-dimethylurea) and/or 4,4'-methylene bis(phenyldimethylurea).

Qureshi et al. disclose a similar epoxy-based composition used for prepregs (*see Abstract; column 3, line 63 through column 4, line 41*). Furthermore, they disclose that the

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instantly claimed urea-based accelerators are recognized in the art as suitable accelerators for this type of system (*see column 5, lines 16-38, particularly lines 28-29*). They are used to increase the rate of cure. In light of this, it has been found that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed urea-based accelerators, as taught by Qureshi et al., in the composition of Honda et al. because: (a) Honda et al. contemplate the use of any curing accelerator, as long as it is generally used in accelerating curing of an epoxy resin; and (b) the teachings of Qureshi et al. establish that the instantly claimed urea-based accelerators are recognized in the art as suitable accelerators for this type of system.

11. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Middleman (US Pat. No. 5,269,863).

Regarding claims 13, 15, and 16, Honda et al. contemplate the use of glass fabric or cloth to manufacture their prepreg. These prepreps are then used to manufacture multi-layer circuit boards (*see column 3, line 65 through column 4, line 21*). However, they fail to disclose: **(13)** a prepreg, prepared by impregnating carbon fiber with the epoxy resin composition for carbon-fiber-reinforced composite materials according to claim 1; **(15)** a fiber-reinforced composite sheet, characterized by comprising a cured resin prepared by curing the epoxy resin composition for carbon-fiber-reinforced composite materials according to claim 1; and carbon fiber; and **(16)** a fiber-reinforced composite sheet, prepared by curing a prepreg according to claim 13.

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Middleman discloses similar prepreg materials used to manufacture multi-layer circuit boards (*see column 3, lines 9-25; column 4, lines 33-46*). The teachings of Middleman establish that carbon fibers/fabrics, in addition to glass fibers/fabrics are recognized in the art as suitable reinforcing materials for circuit board prepreps. They are functional equivalent materials used to reinforce the prepreg/circuit board structure. In light of this, it has been found that substituting functional equivalents known for the same purpose is *prima facie* obvious – *see MPEP 2144.06*. Such a substitution would have obviously satisfied the instantly claimed invention, as set forth in claims 13, 15, and 16.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the glass fiber/fabric of Honda et al. with carbon/fiber fabric because the teachings of Middleman establish that carbon fiber/fabrics, in addition to glass fiber/fabrics are recognized in the art as suitable reinforcing materials for circuit board prepreps. They are functional equivalent materials used to reinforce the prepreg/circuit board structure.

Regarding claim 14, Honda et al. fail to disclose: **(14)** characterized in that the fiber volume content of a prepreg is 30 to 95%.

The teachings of Middleman further establish that the instantly claimed fiber volume content is recognized as a suitable fiber volume content for this type of application (*see column 4, lines 47-56*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed fiber volume content in the prepreg of Honda et al. because: (a) the teachings of Middleman establish that carbon fiber/fabrics, in addition to glass fiber/fabrics are recognized in the art as suitable reinforcing materials for circuit board prepreps;

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and (b) the teachings of Middleman further establish that the instantly claimed fiber volume content is recognized in the art as a suitable fiber volume content for this type of application.

International Search Report

12. The corresponding international search report for this application cites three X-references. All of these X-references have been considered; however, none of them appear to reasonably teach or suggest the phosphorus content set forth in claim 1.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bruynseels et al. (US Pat. No. 5,859,097) disclose a similar composition; however, they do not use an amine-type curing agent.

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Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/
Primary Examiner, Art Unit 1796

June 19, 2009